MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2017/2018

DCA5018 – ELECTRIC CIRCUIT

(DEE / DTE)

12 OCTOBER 2017
2.30 p.m – 4.30 p.m
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of **4** pages with **4** questions.
2. Answer **ALL** questions. All necessary working steps must be shown.
3. Please write all your answers in the answer booklet provided.

QUESTION 1 [25 MARKS]

a) Imagine that you have two units of 100 Ω resistors. Which connection gives larger amount of equivalent resistance? Prove the comparison with any example. [5 marks]

b) For the circuit shown in Figure 1, determine the following:

i) The total resistance. [4 marks]

ii) Current flowing through each resistor. [9 marks]

iii) Voltage across each resistor. [5 marks]

iv) Power dissipated at resistor R_1. [2 marks]

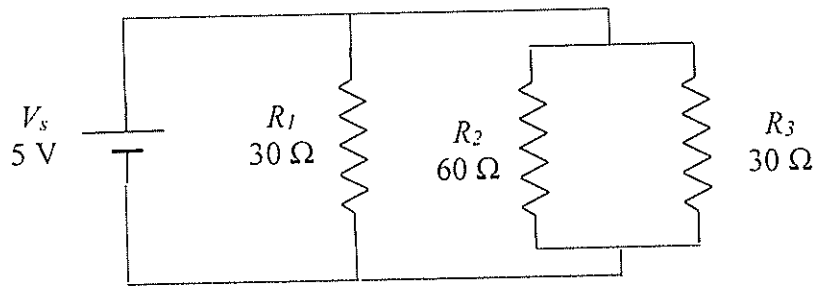

Figure 1

Continued...

QUESTION 2 [25 MARKS]

a) Use the principle of superposition to find V_0 in the circuit of Figure 2. Provide an equivalent circuit for each iteration. [11 marks]

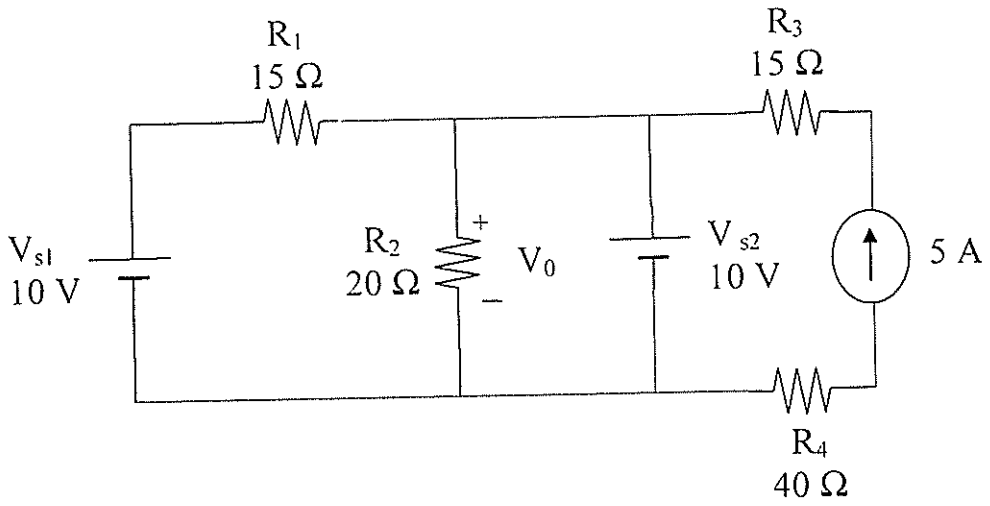

Figure 2

b) By using Mesh Analysis method, determine the voltage at R_3 as shown in Figure 3. [14 marks]

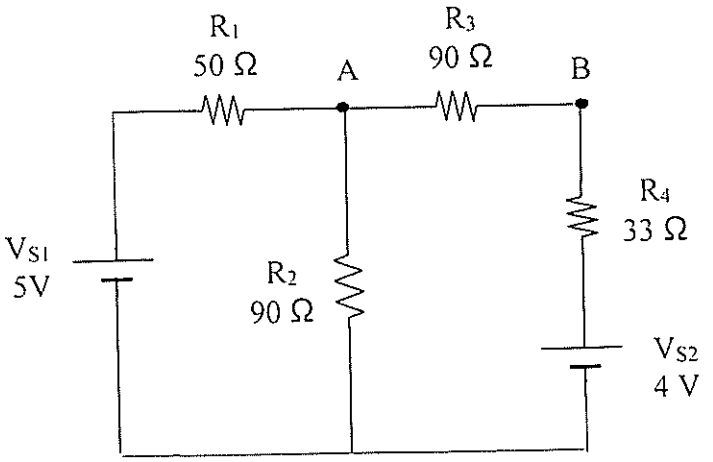

Figure 3

Continued...

QUESTION 3 [25 MARKS]

For the circuit shown in Figure 4, calculate the steady state current $i(t)$, $i_1(t)$, $i_2(t)$ and $i_3(t)$.

[25 marks]

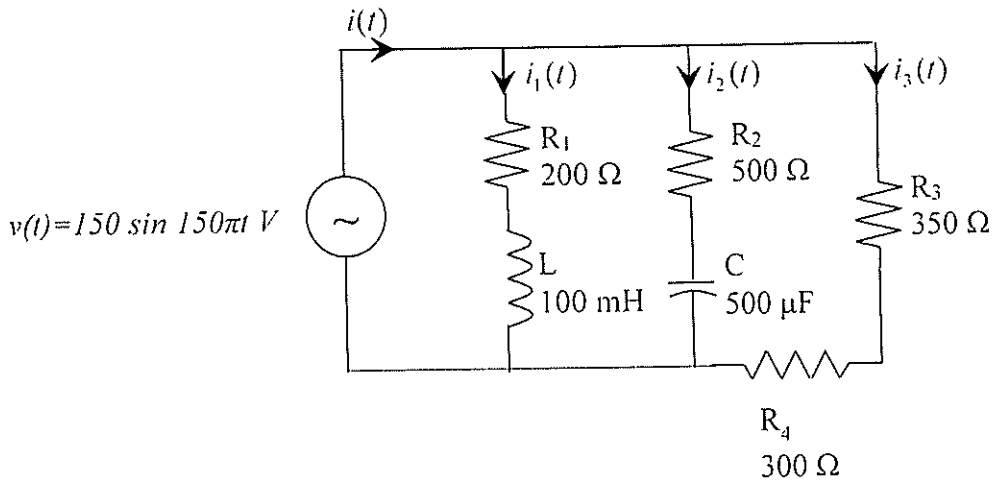

Figure 4

QUESTION 4 [25 MARKS]

a) Fill in information in Table 1 below to indicate the manner in which series and parallel circuits differ.

	Series Circuit	Parallel Circuit
i) Definition: A closed circuit in which the current follows _____ path.		
ii) Observation: If one light bulb goes out, the other light bulbs _____.		
iii) Observation: As the number of resistors is increased, the overall current _____.		
iv) Observation: As the number of resistors is increased, the overall resistance _____.		

Table 1

[8 marks]

Continued...

b) With an assistance of suitable diagrams, explain the **THREE** stages involved in the **storage cycle** for transient analysis of RL circuit. Provide necessary formula to support your answer.

[12 marks]

c) When a capacitor charges or discharges through a resistance, a certain time is required from the capacitor to be fully charged or discharged.

i) Define ***time constant,*** τ.

[2 marks]

ii) State the formula for time constant in RC and RL circuit.

[3 marks]

End of Page.